Supported SelfCare: Integrated Technological Solution to Cost-Effectively Manage the Chronically Ill

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Background. Each year in the United States, more than 80% of direct medical costs are attributed to patients suffering from chronic illnesses, such as heart failure, asthma, and diabetes. These patients levy a highly disproportionate cost burden on the health care system. The situation is exacerbated by the trend toward managed care, which requires physicians to provide frequent service to this sicker group of patients for a capitated fee. Furthermore, communication between providers and chronically ill patients is often fragmented and poor, eroding the continuity of care and undermining patient compliance with treatment. In the managed care setting, physicians and healthcare providers are less likely to invest in the long-term health of patients due to both the effects of capitation and the high rate of member turnover in health plans.

Recent advances in telecommunications and information technology, however, can play a vital role in developing a more integrated and cost-effective care delivery system for the chronically ill. The LifeMasters[SM] Supported SelfCare[SM] Program (HiLife Inc., Newport Beach, Calif.) was developed to improve care and reduce resource utilization by facilitating interactions between patients and caregivers. The program integrates a variety of technological components—both simple and advanced—to provide tools that allow patients to become partners in their care while generating timely information that allows physicians to intervene early to prevent unnecessary hospitalizations. It was designed to use technology not simply to process and track health care information, but to fundamentally change how chronically ill patients are managed.

System. Patients use any touch tone phone to provide information about their vital signs and symptoms by answering questions asked by an Interactive Voice Response (IVR) unit. The IVR is an integrated, knowledge-based system that uses branching logic to provide scripted questions in real time based on patient responses. If patients do not call as scheduled or if their responses indicate that intervention is warranted, the IVR notifies a nursing station manned by HiLife clinical nurse specialists. The nurse will then contact the patient, and upon verification of the problem, the system generates an exception report that is faxed to the physician. The knowledge-based component is integrated with the nursing station desktop software, which provides nurses with scripted prompts based on custom protocols for use during patient interactions and generates medication reminders sent to patients via alphanumeric pagers. The system creates a patient record and comprehensive medication list.

To ensure both stability and responsiveness, LifeMasters runs on Intel Pentium servers using Microsoft NT Server and SQL*Server. The nursing station desktop software was developed using Microsoft's ActiveX Component technology so that the system is well-positioned to deliver the client technology to any desktop that has an ActiveX enabled web browser. This platform independence will allow HiLife to provide system access to both nurses and patients, regardless of geographic location, by leveraging the power of Internet technologies.

Evaluation. The feasibility of the system was evaluated in a preliminary study to assess patient acceptance and its ability to reduce hospitalizations.[1] Twenty-seven patients suffering from congestive heart failure used the system over a period of 8 1/2 months. There was a significant decrease in total cardiac hospital days (0.6 versus 8.6 days per patient per year of follow-up) and a trend toward fewer admissions (0.2 versus 0.6 per patient per year) for patients on the program. Fifty-two notification reports were generated, requiring 14 physician interventions (mostly medication adjustments by phone). Patient satisfaction was excellent, with 80% rating the program useful. The system also was validated in a subsequent study in a managed care setting.

Conclusions. Providing adequate care for chronic disease patients presents an enormous and costly challenge. The LifeMasters Program's unique combination of technology and the human touch allows care to be tailored to optimize interactions and make patients partners in their health care. The role of the physician is not replaced by the successful application of technology; rather, the technology allows physicians to provide a higher level of care for this costly and difficult-to-manage patient population.

1. Shah NB, Der E, Ruggerio C, Heidenreich PA, Massie B. Prevention of hospitalizations for heart failure by an interactive home monitoring program. *Circulation.* 1996;94:I-194. Abstract.